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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,293	12/18/2001	Lei Wang	P21788	8093
7055	7590	11/12/2004	EXAMINER	
GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191			STREGE, JOHN B	
			ART UNIT	PAPER NUMBER
			2625	

DATE MAILED: 11/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/020,293

Applicant(s)

WANG, LEI

Examiner

John B Strege

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☒ Claim(s) 5-33 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 04/04,01/04,03/02.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 5-33 are objected to because of the following informalities: Since the claims are written each with a separate preamble it appears that they are independent claims, however they have been charged as dependent claims. If the Applicant desires the claims to be independent (i.e. a separate preamble for each claim) then the limitations of any other claims referred to in the claim should be copied into the claim instead of referring to the number. If the Applicant desires to make the claims dependent then there should not be separate preambles for the dependent claims and the Applicant should insure that there is adequate antecedent basis for all of the limitations. For example, the manner in which line 1 of claim 10 is written "of calculating the second-order eigenfaces" lacks antecedent basis. Appropriate correction of these matters is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2,4,10-21,24-25, and 28-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "the lighting-invariant face descriptor" in line

7. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the view-angle-invariant face descriptor" in line 9. There is insufficient antecedent basis for this limitation in the claim.

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Claim 10 and 11 recite the limitation "the second-order eigenfaces" in line

1. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the quantization step" in line 4 and "said divided values" in line 7. There is insufficient antecedent basis for these limitations in the claim.

Claim 13 recites the limitation "the quatization step" in line 5 and "said divided values" in line 8. There is insufficient antecedent basis for these limitations in the claim.

Claim 14 recites the limitation "getting the recovered adjusted second-order eigenface" in line 3, "the said quantization step" in line 5. There is insufficient antecedent basis for these limitations in the claim.

Claim 15 recites the limitation "the recovered adjusted first-order eigenface" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 16 recites the limitation "the training images" in line 4, and "said quantization step" in line 7. There is insufficient antecedent basis for these limitations in the claim.

Claims 17-18 recite the limitation "the training images" in line 4, and "said quantization step" in line 7. There is insufficient antecedent basis for these limitations in the claims.

Claim 19 recites the limitation "the training images" in line 4, "said quantization step" in line 7, and "the training set" in line 11. There is insufficient antecedent basis for these limitations in the claim.

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Claims 20-21, 24-25 recite the limitation "the training face images" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 28-29 recite the limitation "the corresponding code word" in line 4. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-33 are rejected under 35 U.S.C. 102(a) as being anticipated by Wang et al. "*Experimental Results of Face Description Based on the 2<sup>nd</sup>-order Eigenface Method*" (hereinafter "Wang") cited in the Information Disclosure Statement filed 04/21/04.

Regarding claim 4, Wang discloses a method of extracting features for view-angle-invariant face description, comprising the steps of: getting adjusted first -order eigenfeatures (section 3 lighting-invariant and view-angle-invariant face description, first sentence of section 3.1 discloses getting first-order eigenfeatures, and section 3.2 discloses eigenface adjustment); getting adjusted second -order eigenfeatures (first sentence of section 3.1 discloses getting second-order eigenfeatures, and section 3.2 discloses eigenface adjustment); quantizing said adjusted first -order eigenfeatures (section 3.3 paragraph under equation 10); quantizing said adjusted second -order eigenfeatures (section 3.3

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paragraph under equation 10); selecting features to construct face descriptor to describe faces from said quantized first-order and second -order eigenfeatures (section 3.1); and coding said selected eigenfeatures in the view-angle-invariant face descriptor (section 3, further the whole article deals with coding of moving pictures).

Claims 1-3 disclose limitations that have already been addressed in the rejection of claim 4.

Claims 5-33 are all disclosed in sections 2 and 3 of Wang.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 1-2,5,8,14,16-17,22,24, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moghaddam et al. USPN 5,710,833 (hereinafter "Moghaddam").

Claim 2 discloses, "a method of extracting features for lighting-invariant face description, comprising the steps of: getting adjusted second -order eigenfeatures of a face image; quantizing said adjusted second-order eigenfeatures; selecting features to construct face descriptor to describe faces from the said quantized second -order eigenfeatures; and coding said selected eigenfeatures in the lighting-invariant face descriptor."

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Moghaddam discloses a method to detect, recognize, and encode various types of complex, multifeatured entities such as human faces (col. 1 lines 10-15). Moghaddam recites a contrast normalization module processes the centered face to compensate for variations in the input imagery arising from global illumination changes (col. 11 lines 24-29). Following the contrast normalization the face is processed by the feature extraction module 204 projecting the face vector onto a set of eigenfaces for purpose of recognition recognition (col. 11 lines 36-39). These steps correspond to getting adjusted eigenfeatures of a face image. Moghaddam further recites that the adjusted face image (and/or the reconstructed face and/or the input image, processed by the feature extraction module 204 into projection coefficients) can be encoded by an encoder module 212 for maximum efficiency in representation (col. 11 lines 55-60). This is done by selecting features and quantizing the normalized coefficients (col. 11 line 64-col. 12 line 14). As this method is compensating for light variation it reads on the lighting invariant face descriptor.

Moghaddam does not explicitly use the term second-order eigenfeatures, however these second order eigenfeatures represent eigenfeatures that take into account the variations of lighting. Thus as Moghaddam discloses eigenfeatures that account for variations in lighting these can be read as the 2<sup>nd</sup> order eigenfeatures.

All of the limitations of claim 1 have already been addressed with the rejection of claim 2.

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Regarding claims 5 and 8 columns 5-8 discloses density estimation of the eigenspace decomposition (see especially equation 8 of col. 7).

Regarding claim 14 and 16-17, Moghaddam discloses these limitations in the paragraph bridging cols. 11-12 and also column 3 lines 23-32.

Regarding claim 22, Moghaddam discloses getting the Euclidean distances of eigenfeatures and choosing the best pair of matching faces (paragraph bridging cols. 5-6).

Regarding claim 24, Moghaddam discloses classifying the eigenfeatures into bit allocations (paragraph bridging cols. 11-12) and using an entropy coding method (col. 7 lines 12-43).

Regarding claim 26, Moghaddam does not explicitly disclose Huffman coding. Huffman coding is well known in the art of facial recognition thus the examiner declares official notice. The motivation for using Huffman is that it is a proven method for coding.

Regarding claim 27, Moghaddam discloses an arithmetic coding method (col. 7 lines 12-43).

Regarding claim 28, Moghaddam does not explicitly disclose looking up the code table for each quantized eigenfeature and using the corresponding code word to represent the quantized eigenfeature, however it is well known in the art of facial recognition to do so, thus the examiner declares official notice. It would be obvious to use a code word to represent the quantized feature to allow for coding more efficiently.



***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 6,430,306 Slocum et al. System and Methods for identifying images (see especially col. 8 lines 10-65 dealing with taking a mean of a set of training faces to form adjusted eigenface methods).

USPN 5,164,992 Turk et al. Face Recognition System.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



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